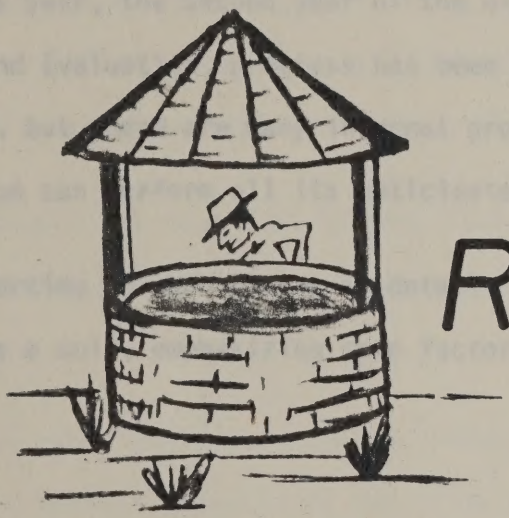
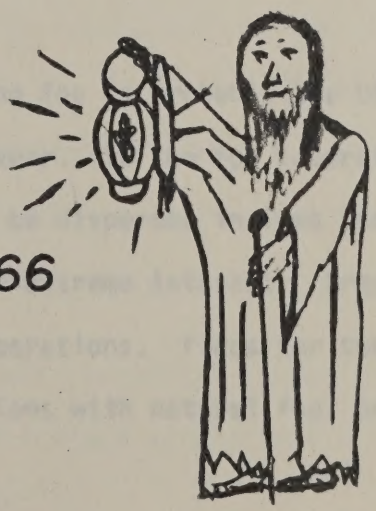
TO KNOW IS DIFFICULT, TO ACT IS EASY. THE TRUTH IS HIDDEN AT THE BOTTOM OF THE WELL. ALL THINGS ARE TO BE EXAMINED AND CALLED INTO QUESTION. ALL TRUTHS ARE WAITING IN ALL THINGS. THE MAN WHO FINDS A TRUTH LIGHTS A TORCH. THERE MAY BE ONLY ONE TRUTH BUT IT HAS A THOUSAND FACETS.

ANNUAL REPORT



DIVISION OF RESEARCH AND EVALUATION



FISCAL YEAR
1965-1966

TO KNOW IS DIFFICULT, TO ACT IS EASY. THE TRUTH IS HIDDEN AT THE BOTTOM OF THE WELL. ALL THINGS ARE TO BE EXAMINED AND CALLED INTO QUESTION. ALL TRUTHS ARE WAITING IN ALL THINGS. THE MAN WHO FINDS A TRUTH LIGHTS A TORCH. THERE MAY BE ONLY ONE TRUTH BUT IT HAS A THOUSAND FACETS.

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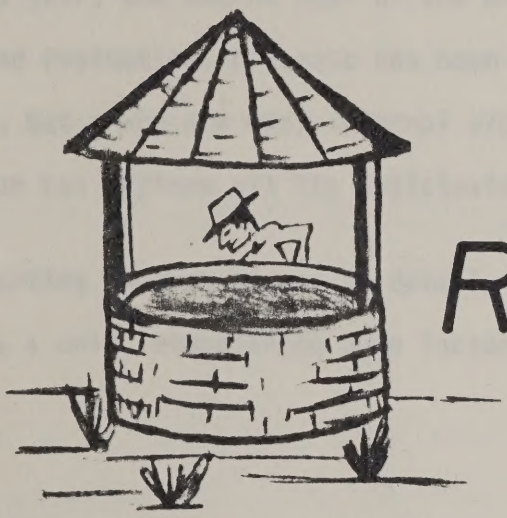
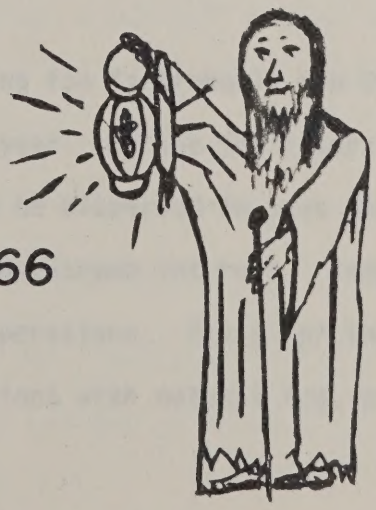


DIVISION OF RESEARCH AND EVALUATION



FISCAL YEAR

1965-1966

DIVISION OF RESEARCH AND EVALUATION

FISCAL YEAR 1965-66 ANNUAL REPORT

During this year, the second year of the existence of the Division of Research and Evaluation, progress has been quite rapid compared to the first year, but there are many internal problems to be overcome before the Division can perform all its anticipated functions.

Before reporting on each Bureau in detail, let us take a look at the Division as a unit, emphasizing some factors that deserve particular attention.

ACCOMPLISHMENTS

During the fiscal year, 13 reports were completed compared to 4 during the previous year. These reports are listed in an appended table. (See also Figure 1)

The development of a method for dispersing fog is probably the Division's most outstanding achievement during the year. In the fog laboratory at Mercer Airport, a most dense fog can now be dispersed in less than 5 minutes, as witnessed by many people with extreme interest. Preparations have also been made for future outdoor operations. Plans for the next fiscal year include practical demonstrations with natural fog, prior to permanent, practical installations.

DIVISION OF RESEARCH AND EVALUATION

FISCAL YEAR 1969-70 ANNUAL REPORT

During this year, the second year of the existence of the Division of Research and Evaluation, progress has been quite rapid compared to the first year, but there are many internal problems to be overcome before the Division can perform all its anticipated functions.

Before reporting on each Bureau in detail, let us take a look at the Division as a unit, emphasizing some factors that deserve particular attention.

ACCOMPLISHMENTS

During the Fiscal year, 13 reports were completed compared to 3 during the previous year. These reports are listed in an appendix table. (See also Figure 1)

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Research on skid resistance successfully isolated a serious cause of skidding accidents, with the result that corrective measures are being taken by the Highway Department to reduce that danger.

A Milepost System for the State highways, under consideration for many years within the Highway Department, has been completed. The Division's report was adopted for use by the Department.

The comprehensive report on Studded Tires, although it was prepared for conditions prevailing in New Jersey, may be nationally of great interest.

The study about the Socio-Economic Effects of the Verrazano Narrows Bridge on Middlesex County is the first of a series illustrating the impact of highways on society. It appears possible, from a general point of view, to measure the benefits to society of each highway or section of highway that has been built.

Another study under way is a two-wire Emergency Call System to be located along the highway, available at all locations. To call for assistance one would simply squeeze the wires together at any point. The simplicity of the idea promises to make it more effective than other systems being investigated in other states.

An investigation of Air Pollution was also initiated during the year. This problem will become more and more serious as population and motor vehicle traffic continue to grow.

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A Mileage System for the State Highways, under consideration for many years within the Highway Department, has been completed. The Division's report was adopted for use by the Department.

The comprehensive report on student traffic, attached it was prepared for operations research in the Jersey, may be especially of great interest.

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During the year, Division representatives witnessed a demonstration of Holography in which an image appeared suspended in the air without any physical properties, but which could not be visually detected as being different from the real thing. The term Holography, coined by Professor Stoke of the University of Michigan, refers to "Wave-Front Reconstruction Photography". The Television and Motion Picture industry shows increasing interest in this technique because of its three-dimensional and color characteristics.

This Division is investigating its potential usefulness for highway signing without the use of signposts or sign structures. A vehicle running off the side of the road could not be damaged nor could the car's occupants be injured, by colliding with non-physical signposts.

PROGRESS

Specific enterprises have individual ways of measuring progress. Businesses generally measure progress by the amount of income produced. Overall highway progress is measured by the amount of road mileage provided for the public and by the number of highway improvements that are made.

In order to evaluate progress in research, the amount of constructive thinking should be measured, but this can't be done. It, therefore, remains for the people assigned to this work to have an interest in their assignments, and to be reliable and conscientious. Then, progress can be somewhat measured by the number of reports generated by thinking, and by supporting tests.

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Research

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In addition to the completed reports, there are generally many in progress which are not listed. Some reports add a little to our existing knowledge, others may contribute a great deal. It may be that one report which produces much requires only a small effort, whereas another study, that yields little, calls for great exertion. The real value of research efforts can only be measured in the future, if and when application is made of the findings. Keeping in mind that any new knowledge, however simple it may look at first, can well lead later on to an outstanding development.

PERSONNEL

At the end of the fiscal year there were 44 individuals in the Division, whereas the ultimate organization chart specifies 117. Although this is a gain of 12 over the previous year, it is far short of our goal. Recruiting personnel with the necessary qualifications has proved extremely difficult. This is undoubtedly due to our scale of compensation, which is far below the rates obtainable in industry. There is the fact that a lowering of personnel qualifications has not been permissible.

Figure 2 shows the growth in total personnel since the time of the establishment of the Division in July of 1964. Two-thirds of the researchers in the Division have Master's or PhD Degrees. The breakdown by Bureaus is shown in Figure 3 .

A review of the personnel resumes appended to this report reveals qualifications, within the Division of Research and Evaluation, far in excess of many consulting firms. It also indicates a wide range of experience upon which to draw for solutions to the varied types of problems encountered in the transportation of people and goods.

BUREAU OF STRUCTURES AND MATERIALS

FUNCTIONS

The mission and functions of the Bureau of Structures and Materials are to perform scientific research and evaluation pertaining, but not limited to, highway structures and materials, methods of construction and maintenance; evaluation of pavements and structures to investigate substandard performance and to recommend adequate rehabilitation.

The principal goal of the research performed by this Bureau is to improve highway construction, materials, and practices in order to provide better highways and reduce the numbers of fatalities, injuries and accidents.

The Bureau maintains liaison with the Highway Research Board, the American Society for Testing and Materials, the New Jersey Bituminous Concrete Association, the Bureau of Public Roads, research foundations, universities and industry, on matters pertaining to its mission and functions.

BUREAU OF STRUCTURES AND MATERIALS

ACCOMPLISHMENTS

Pavement Design and Joint Inspections

In collaboration with the Bureau of Soils and Subdrainage, pavement designs were recommended for 36 projects. The pavements designed were not only on-main-line roadways, but included ramps, jughandles and incidental connecting roads. This work frequently involved the development of suitable means for the rehabilitation of deteriorated pavements.

Six joint inspections were performed, with appropriate recommendations, on various portland cement concrete pavement projects throughout the State. The responsibility of inspecting joints was transferred to the Division of Materials during the course of the year. This is in keeping with the framework of the recent Departmental reorganization.

Experimental Pavement Project

Progress was made on a continuing project to study the relative performances of the various types of base-course materials commonly used in New Jersey. A second interim report was completed of the test sections installed in Route I-80, Section 5V and Route I-95 Section 1R.

BUREAU OF STRUCTURES AND MATERIALS

Route I-295 Pavement Investigation

Comprehensive investigation of an observed inordinate amount of portland cement concrete pavement cracking in Section 2F was related to thermal effects. It was determined that no major rehabilitation effort was required.

Undisturbed Sampling of Sub-base Materials

A preliminary attempt to develop a method of taking cores in granular materials by the use of freezing techniques. A report was submitted.

Route I-78 Pavement Investigation

Detailed investigation of portland cement concrete pavement cracking, found to be associated with the phenomenon of pumping in Section 2J (Jugtown Mountain). Preliminary rehabilitation measures were recommended by this Bureau and executed by the Maintenance Division.

Route 72 Pavement Investigation

This involved a special skid resistance study of the western approach to the Manahawkin Bay Bridge in Stafford Township, Ocean County. Pertinent recommendations for improving the skid resistance of the highway surface and other significant recommendations for redesigning the approach were submitted.

BUREAU OF STRUCTURES AND MATERIALS

Statistical Correlation and Variance Analysis

Progress was made on a study of the statistical analysis of the variance in tests of structural concrete cylinders, the correlation between mixture tests and pavement tests for bituminous pavements, and the variance in sampling, testing, and materials or operations for bituminous pavements.

Preformed Elastomeric Joint Sealers

A study of the characteristics and performance of elastomeric joint sealers for use on bridges resulted in individual recommendations which should significantly improve the performance of this type of joint in New Jersey.

Anti-Scaling Agents for Concrete Surfaces

The various anti-scaling materials (oils, resins, plastics, silicones, etc.) for concrete bridge deck surfaces are being evaluated.

Rumble Strips

This is a materials and application study of various methods of introducing an acoustical and psychological effect into the pavement to warn or gain the attention of motorists approaching a potentially hazardous situation, such as a traffic circle, traffic signals, etc. Developed and installed such strips on the Route 206 northbound approach to the Red Lion Circle intersection with Route 70, as well as material test strips at Fernwood.

BUREAU OF STRUCTURES AND MATERIALS

Performance Evaluation of Composite Pavement on Route 3

Continued a study of the performance of composite pavements, subjected to a large volume of heavy truck traffic, with particular regard to surface continuity; this type of pavement construction indicates considerable potential to selectively provide improved pavement performance.

Pavement Riding Quality

Progress was made in a continuing study to evaluate and improve the riding qualities of portland cement and bituminous concrete pavements, including bridge decks.

Skid Resistance Studies

The Bureau procured a portable skid resistance tester and initiated a series of tests to determine the surface skid resistance at selected locations with high accident rates. A contract was also initiated with Stevens Institute of Technology for the development, manufacture and testing of a field skid testing device. This study is expected to produce a refinement of pavement surface characteristics as well as a continuous program to evaluate the skid properties of the road surfaces at specific locations.

Miscellaneous

Progress also has been achieved during this fiscal year in the following areas:

BUREAU OF STRUCTURES AND MATERIALS

a. Pavement Patching Techniques and Materials

b. Portland Cement Concrete Pavement Design Evaluation

c. Non-Metallic Bridge Bearings

d. Chain Link Fencing Evaluation

e. Studded Tire Evaluation

f. Study of Dolomite Aggregate in Relation to Pavement Slipperiness

g. Non-Destructive Testing of Concrete

h. Bridge Construction of Unpainted Low-Alloy ASTM A-242 Steel

i. Evaluation of Inlet Grating and Manhole Cover Materials

BUREAU OF ELECTRONICS AND SCIENTIFIC AIDS

FUNCTIONS

The mission and functions of the Bureau of Electronics and Scientific Aids are to perform scientific research and evaluation pertaining, but not limited to, the fields of electronics and chemistry; expanding on the areas of investigation not readily identifiable with the traffic safety engineer or the structural engineer, but deemed desirable to investigate to improve the construction and maintenance of highways as well as increase the safe flow of traffic.

The principal goal of the research performed by this Bureau is to improve the construction, maintenance and operations of the New Jersey State Highway System to the best advantage of the driving public and the public at large in terms of safety, operating cost, time saving, convenience, comfort, the national economy and security.

The Bureau maintains liaison with the Highway Research Board, the Institute of Electrical and Electronics Engineers, the American Chemical Society, the Bureau of Public Roads, research foundations, universities and industry, on matters pertaining to its mission and functions.

BUREAU OF ELECTRONICS AND SCIENTIFIC AIDS

ACCOMPLISHMENTS

Pavement Marking

The accidents occasioned by drivers travelling in the wrong direction on any highway called for research into their cause as well as their prevention. A study of the frequency of wrong-way driving is already included in another research project. It is proposed to attempt in the meantime to eliminate wrong-way driving by the simple expediency of painting large arrowheads on the roadway as well as the entrance and exit ramps of major arteries. A means of detecting and recording wrong-way drivers is also under study.

Non-Destructive Testing

Several electronic devices for testing the structure of pavements and other highway appurtenances without destroying the structural integrity of the construction have been investigated and evaluation will be continued.

Emergency Call System

Several methods, which will permit the driver of a disabled vehicle to summon assistance from nearby service agencies, are being investigated. These systems will be especially useful to motorists on the Interstate System of Highways where no service areas are included within the limits of the right-of-way.

BUREAU OF ELECTRONICS AND SCIENTIFIC AIDS

Vehicle Detection

Much time is lost after a motorist stops his disabled car on the shoulder of a highway until he receives the necessary help. Since on narrow shoulders there is often not much space between a stranded car on the high-speed traffic, the car is exposed to rear-end collisions. The sooner such a car begins moving again, the sooner the marginal friction is removed, and safety restored. This Bureau initiated studies into possible methods for detecting stopped vehicles, considering especially the effectiveness and cost of each system.

Audio Signs

Investigations have started to devise audible methods for informing motorists of hazardous locations requiring special precautions and to advise them of directions to alternate routes. These systems would supplement the standard visual signs. Special frequency radio is being considered as a primary means for such communications.

Pavement Heating

Means of utilizing solar, nuclear, and/or conventional fuel energy to prevent the formation of ice and snow on roadways are being studied. As a possible additional benefit the requirements of reinforcing materials may be reduced, because of the possibility of maintaining relatively constant temperatures in the pavements throughout the year.

BUREAU OF ELECTRONICS AND SCIENTIFIC AIDS

Mobile T.V. Surveillance

If the behavior patterns of traffic prior to an accident could be recorded accurately, an analysis of these patterns might lead to corrective measures for eliminating this type of accident. Closed-circuit television with a video-tape recorder is being probed, as a means of accumulating true records of repetitious accidents for subsequent study and analysis.

Talking Pavements

Constructing properly spaced corrugations in or on a pavement may make it possible to issue an audible message to the driver of the vehicle as he passes over the site. This is an expansion of the "rumble strip" theory. Distinct contours have been detected on "Dictaphone" records of several words; it is proposed to attempt the reconstruction of these contours on an expanded scale in pavement surfaces.

Fog Broom

The fog-clearing experiments with the "Fog Broom" in the environmental fog chamber at the Mercer County Airport have been very successful. The process will be applied to outdoor installations for which the equipment and materials are being procured. If these further experiments are equally conclusive, it will become desirable to extend the system to the major "fog-prone" areas of the State.

BUREAU OF ELECTRONICS AND SCIENTIFIC AIDS

Vehicle Exhaust Pollution

The problem of air pollution from automotive exhausts is becoming more serious every year. As its contribution to the necessary research, this Bureau has started a preliminary search for the best methods to eliminate the nitrogen oxydes, which are very harmful to human health but have not been investigated by any other agency as yet.

Holography Signing

A recent revival of an old phenomenon, "Wave-Front Reconstruction Photography", now called Holography, suggests the possibility that this system might be used for signing. An impalpable image of the intended sign could be projected on or near the roadway, while the actual physical structure would remain far from the road. There would be nothing solid for a driver to collide with in the event that he should leave the road inadvertently. This type of system might lend itself to displaying imaginary barriers to prevent wrong-way drivers from entering exit ramps. A literary search has been started and a demonstration witnessed.

BUREAU OF SAFETY AND TRAFFIC

FUNCTIONS

The mission and functions of the Bureau of Safety and Traffic are to perform scientific research and evaluation pertaining, but not limited to, traffic safety; transportation of people and commodities; systems and techniques pertaining to design and operation of state highways; the cultural and economic impact on the public of planning, acquiring and operating transport systems.

The principal goal of the research performed by this Bureau is to reduce the number of fatalities, injuries and accidents occurring on the New Jersey State Highways, thereby making our highways the safest, most convenient and efficient system of highways possible.

The Bureau maintains liaison with the Highway Research Board, the Institute of Traffic Engineers, the National Safety Council, the Bureau of Public Roads, research foundations, universities, and industry, on matters pertaining to its mission and functions.

BUREAU OF SAFETY AND TRAFFIC

ACCOMPLISHMENTS

Intersection Design

Ten intersections, including simple and complex designs, were selected for analysis under this project on a continuing basis. This critical review of the efficiency and safety of many types of intersection design should ultimately help in developing improved design policies.

Sufficiency Ratings

The aim of this study is to provide a tool which will permit more adequate scheduling of reconstruction priorities for New Jersey State Highways. The first phase of the study - a literature review of sufficiency-rating methods currently in use in other highway departments - neared completion at the end of the fiscal year. Phase Two progressed toward the determination of factors not used by other highway departments, but pertinent to New Jersey's highways. Its ultimate goals are:

a. Develope a method of determining reconstruction priorities according to prescribed standards, thus eliminating or minimizing personal judgments.

b. Provide legislative officials with advice on the current status of highway facilities, so funds can be allotted on a rational statewide basis.

c. Arrange for annual ratings of the system, as a means to ascertain if annual revenues for highway improvements are adequate.

d. Supply traffic engineers with sufficiency ratings they can use as a basis for safety improvements.

Truck Equivalent

A report was near completion discussing the passenger car equivalency of a truck for level terrain at a signalized location. Additional studies will follow to determine the passenger car equivalency of a truck for various conditions of grade, volume density, curvature, acceleration and deceleration. The complete data will aid in determining highway capacities and formulating design policies.

New Concepts in Highways

Accident statistics are analyzed as a basis for developing a system of safe state highways. Many reasons, based on logic and inconclusive data, are generally given to explain accidents. The present study will coordinate logic and fact in an impressive illustration of evidence. Two reports have been completed, one dealing with a new design to combat accidents, the other one interpreting accident experience on the Interstate and Primary highway systems.

30th Peak Hour Trend

The purpose of this study is to determine the relationship of the design-hour factors to the annual average daily traffic, in order to furnish the designer with the more accurate data he needs to better design our highway system. One study has been completed, updating through 1964 the studies previously made in New Jersey.

BUREAU OF SAFETY AND TRAFFIC

Accident-Design Relationship

The accident, injury and fatality rates are being determined in relation to traffic volume variations for both passenger cars and trucks. The results of this analysis will facilitate the solution of accident problems, by increasing our knowledge of the variation in accident rates at different locations. This will lead to improvements in design and better safety control measures. A preliminary report has been completed for one location; it shows that a definite relationship between accident rates and volume appears to exist.

Milepost System for New Jersey State Highways

The development of a milepost system specifically applicable to New Jersey State Highways was the objective of this assignment. The intention was to provide an accurate method of detecting high accident locations, also to be used as a base referencing system for sufficiency rating procedures. A report was completed and plans are under way for a field installation.

Motor Vehicle Accident Analysis System

A system, based on data processing, was initiated to locate to within .01 mile all hazardous sections of roadway. It will also provide details on each accident at each location, to the end that possible corrections of hazardous conditions can be suggested. For the most effective use of this system, a philosophy of improvement will be formulated, based on accident costs.

BUREAU OF SAFETY AND TRAFFIC

Miscellaneous

Progress also has been achieved during this fiscal year in the following areas:

a. Socio-Economic Impact of Highways

b. Capacity of Design Features not covered by the Capacity Manual

c. Improvements in Traffic Signals

d. Traffic Generating Factors

e. Park and Ride: parking areas linked to car pools or public transportation

f. Highway Delineation: effectiveness of marking methods

g. Intersection Pathfinder; same as f. but for intersections

h. Placement of Highway Guide Signs

i. Signal timing on U. S. 1 between Smith St. and North Ave.

FACILITIES

FARRELL AVENUE

The Office of the Director of the Division and the Supervising Engineers of the three Bureaus are located at 12 Farrell Avenue in the vicinity of the Main Highway Building. The space consisting of approximately 5000 square feet provides office, library and conference facilities.

INMAN AVENUE, RAHWAY

A small combined office and laboratory building has been acquired in Rahway. It provides facilities for the engineers who are primarily engaged in traffic studies in Northern New Jersey, as well as other research projects which can be more suitably undertaken at this location.

MERCER COUNTY AIRPORT

Approximately 900 square feet have been acquired in a building at Mercer County Airport and converted into an environmental "Fog Chamber" where extensive testing and demonstrations of the "Fog Broom" have been carried out.

F. Y. 1965-66

REPORTS PREPARED BY THE DIVISION OF RESEARCH AND EVALUATION

No.	Title	Date	Bureau S.M.	S.T.	E.S.	D.
1.	Experimental Pavement Project, Route I-80, Section 5V and Route I-95, Section 1R - Second Interim Report	9-65	X			
2.	Undisturbed Sampling of Subbase Materials and Soils Utilizing a Frozen Medium	10-65	X			
3.	Operational Effects of Overall Geometrics on Highway Safety	11-65				X
4.	Air Pollution Control, Interim Report	11-65			X	
5.	Evaluation of Reflectorized Highway Signs	11-65		X		
6.	Reinforced Bituminous Overlays in New Jersey	12-65	X			
7.	Low Level Bridge Lighting Installed in New Jersey	12-65		X		
8.	Pavement Investigation Route 78, Section 2J	2-66	X			
9.	Investigation of Asphalt Paving Problems in New Jersey	3-66	X			
10.	A Mile Post System for New Jersey	4-66		X		
11.	30th Peak Hour Trends, 1964	4-66		X		
12.	Relationship of Accident Rates and Accident Involvement with Hourly Volumes	5-66		X		
13.	Investigation Route 72 West Approach to Manahawkin Bay Bridge	5-66	X			

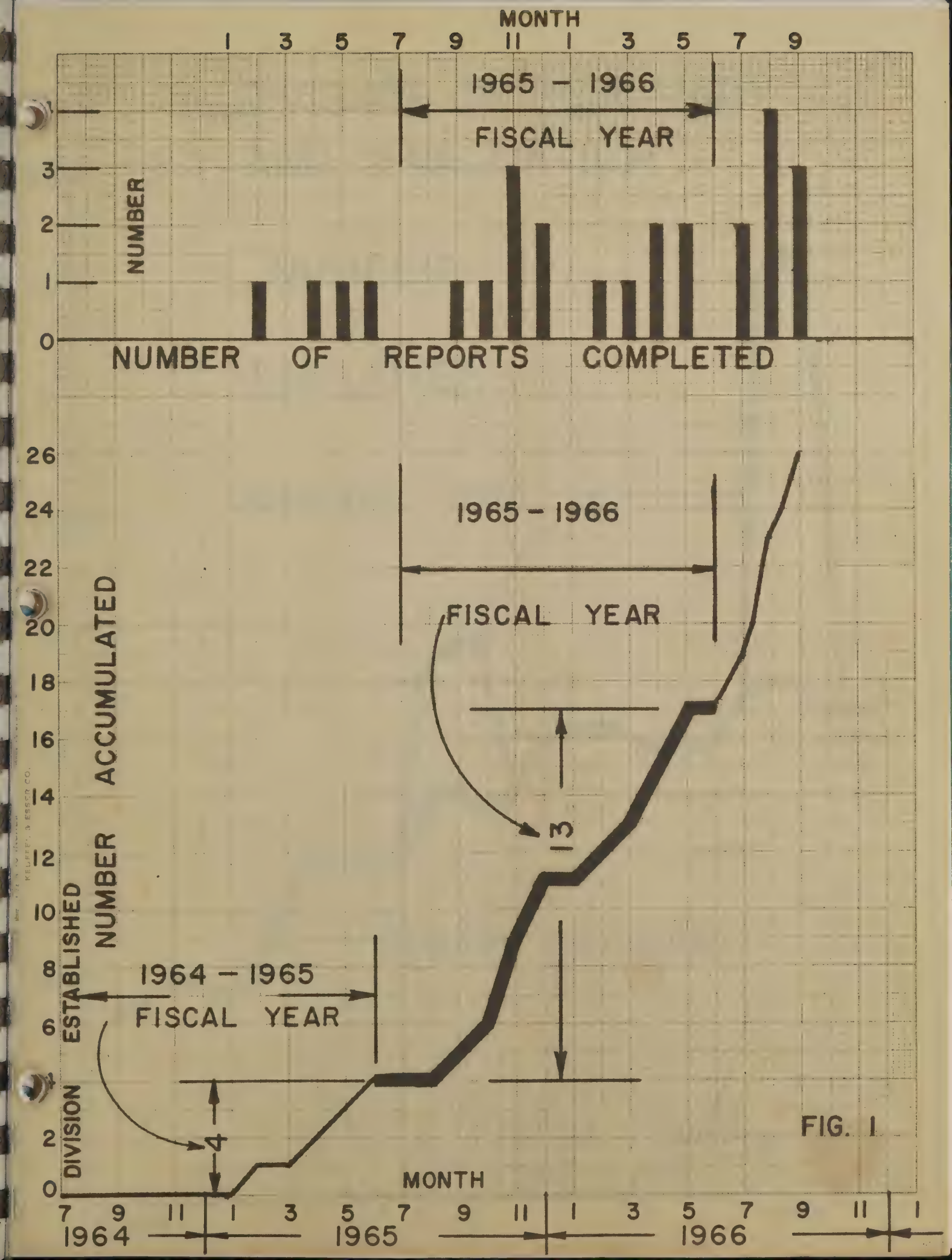
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FIG. 1

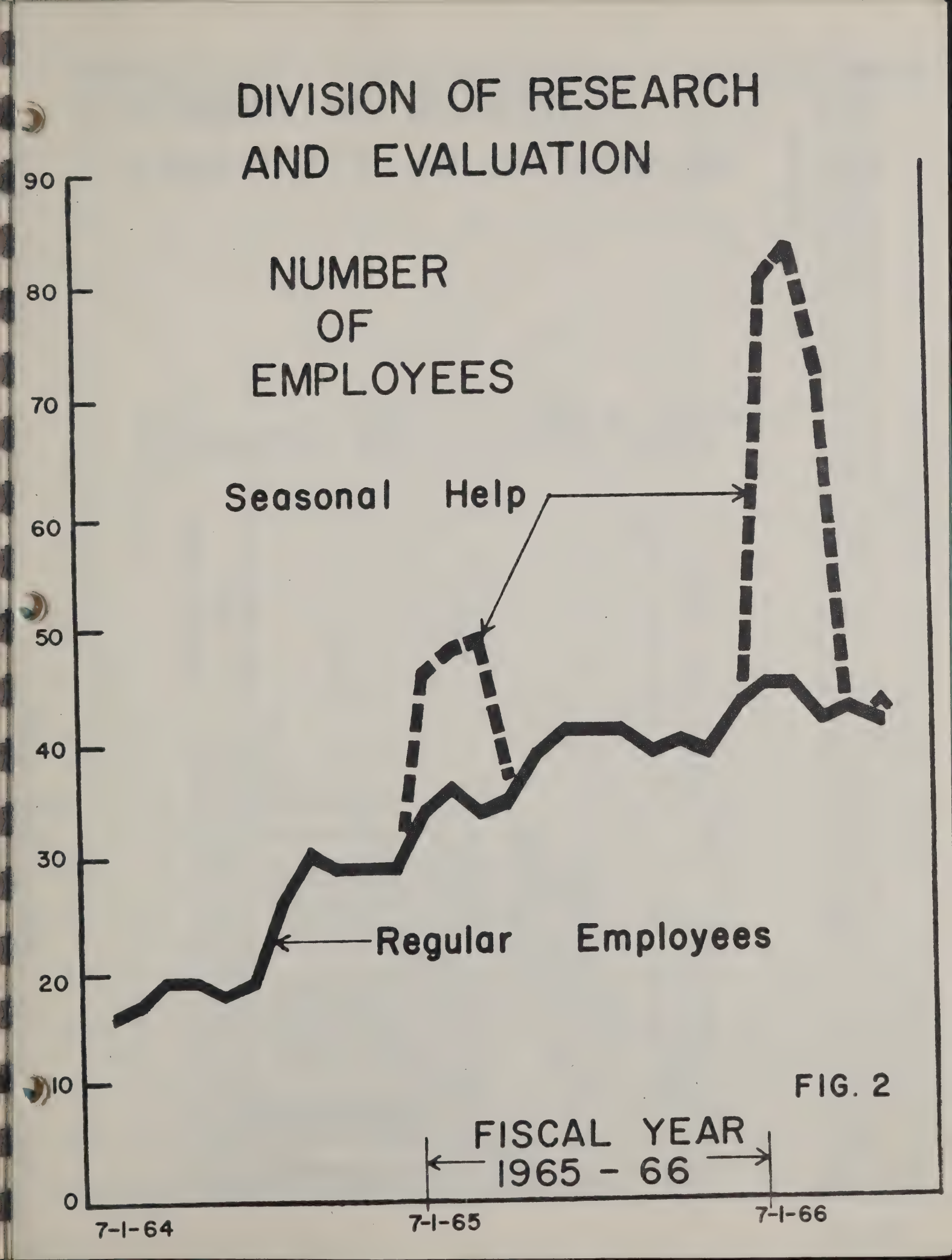
DIVISION OF RESEARCH
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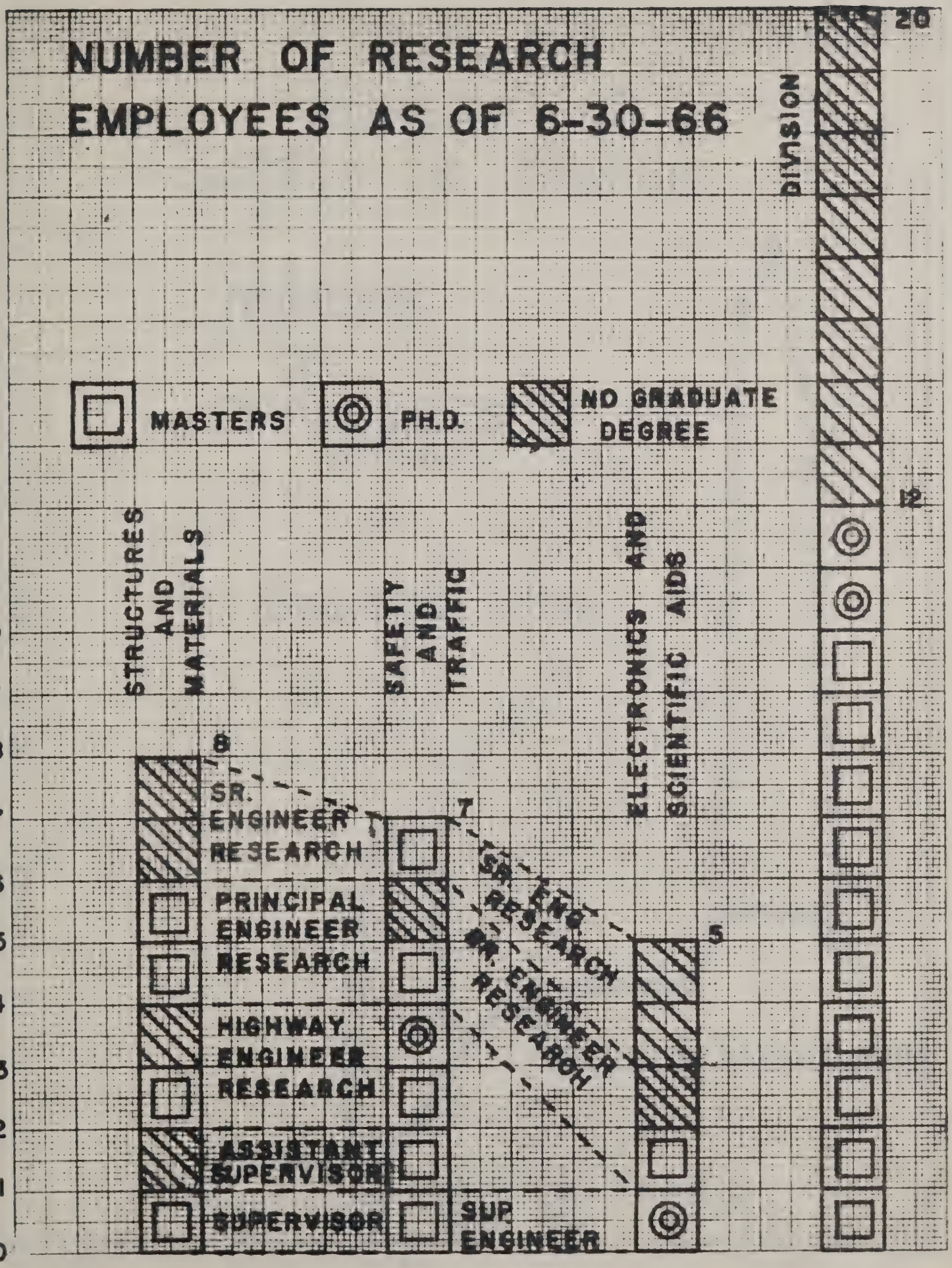
FIG. 2


NUMBER OF RESEARCH EMPLOYEES AS OF 6-30-66
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PH.D.
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STRUCTURES AND MATERIALS
SAFETY AND TRAFFIC
ELECTRONICS AND SCIENTIFIC AIDS
DIVISION
SR. ENGINEER RESEARCH
PRINCIPAL ENGINEER RESEARCH
HIGHWAY ENGINEER RESEARCH
ASSISTANT SUPERVISOR
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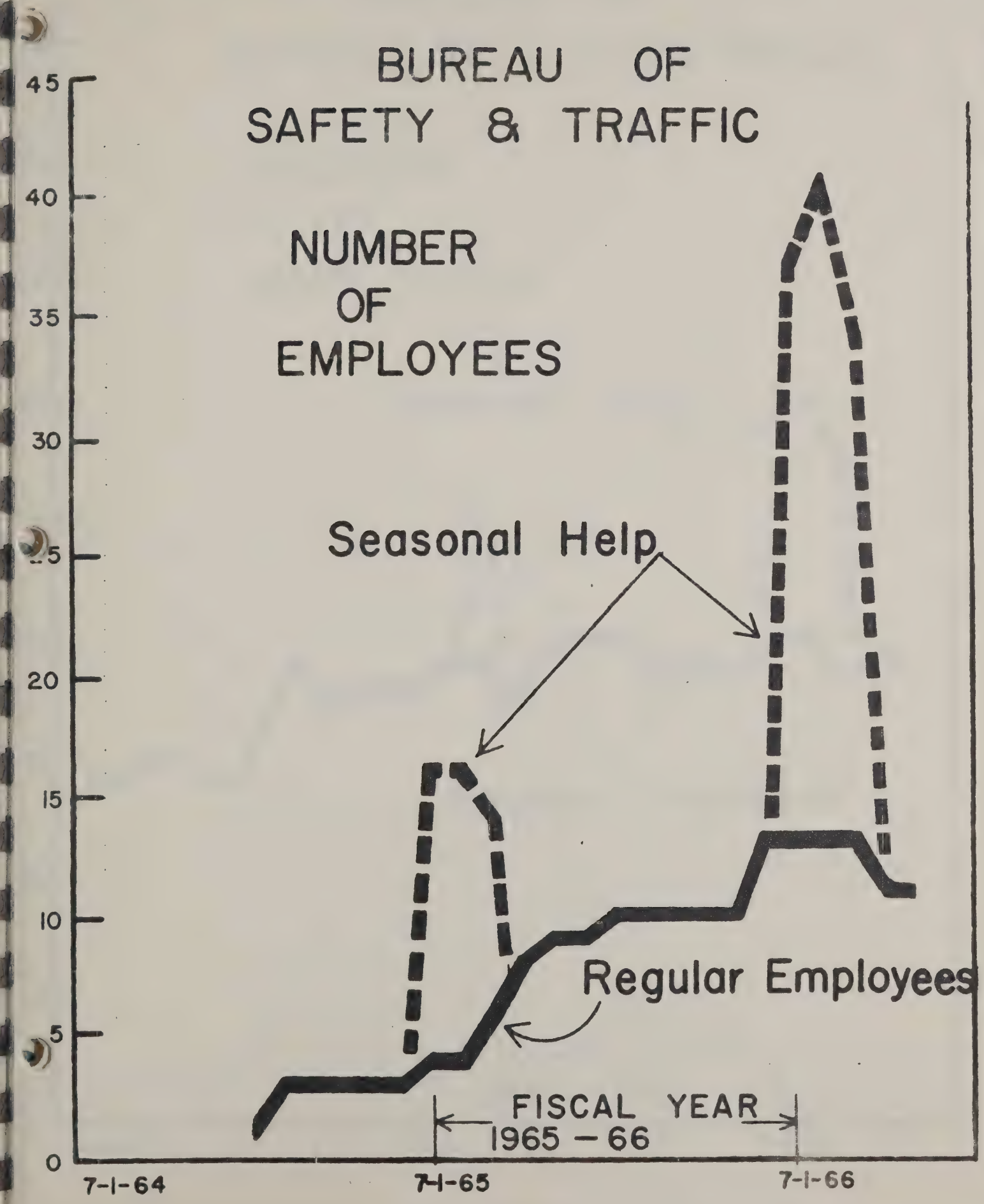
FIG-3


BUREAU OF
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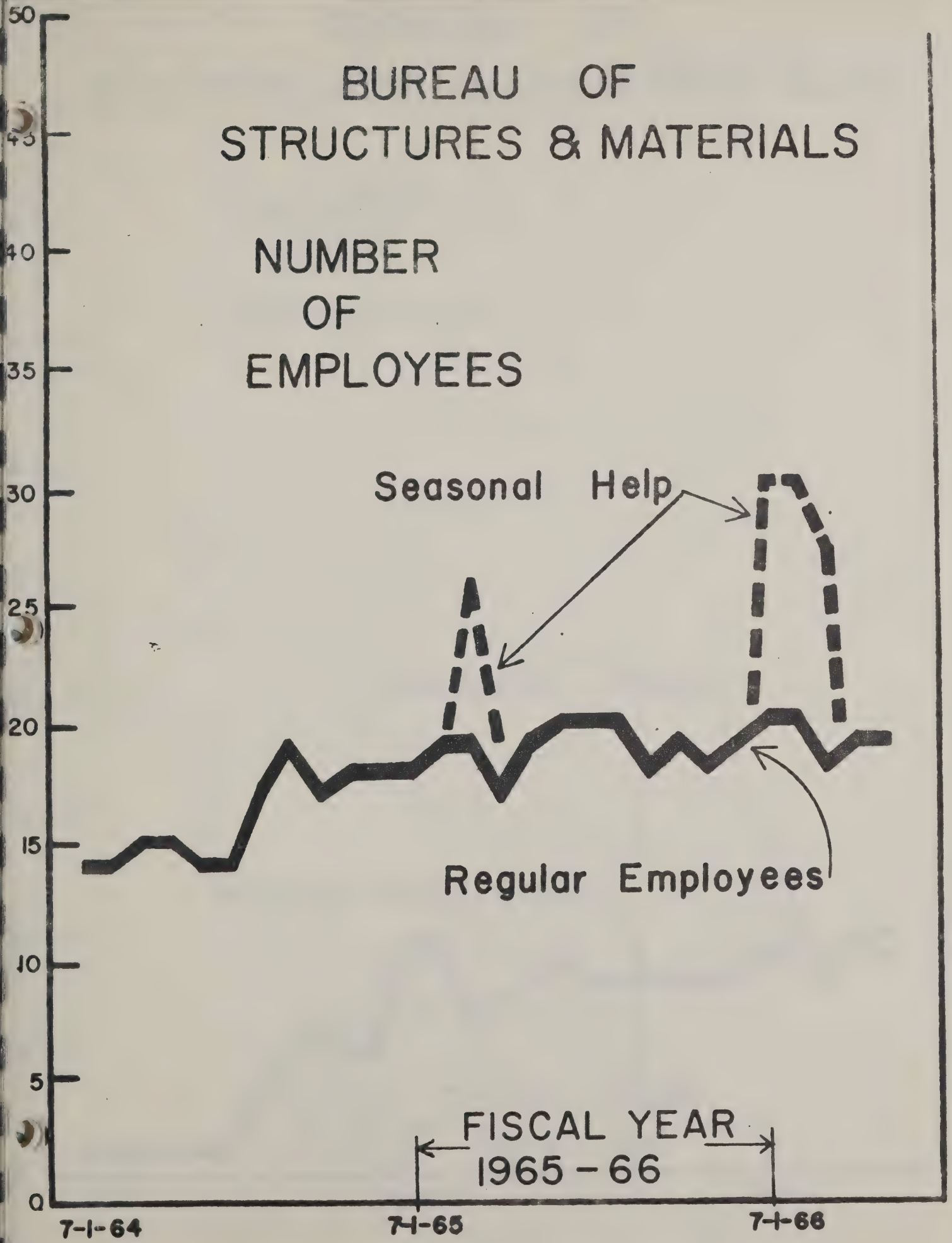
BUREAU OF
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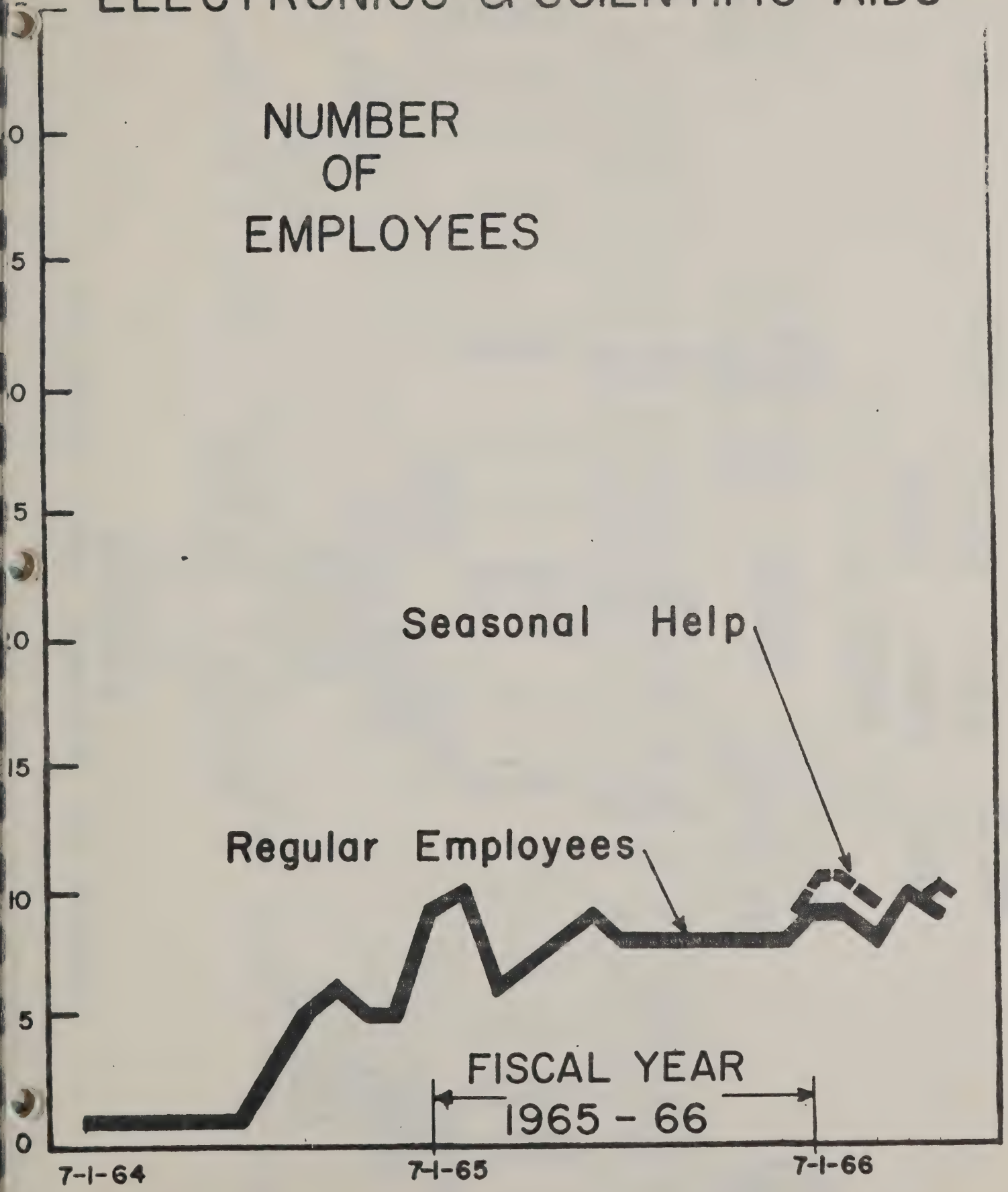
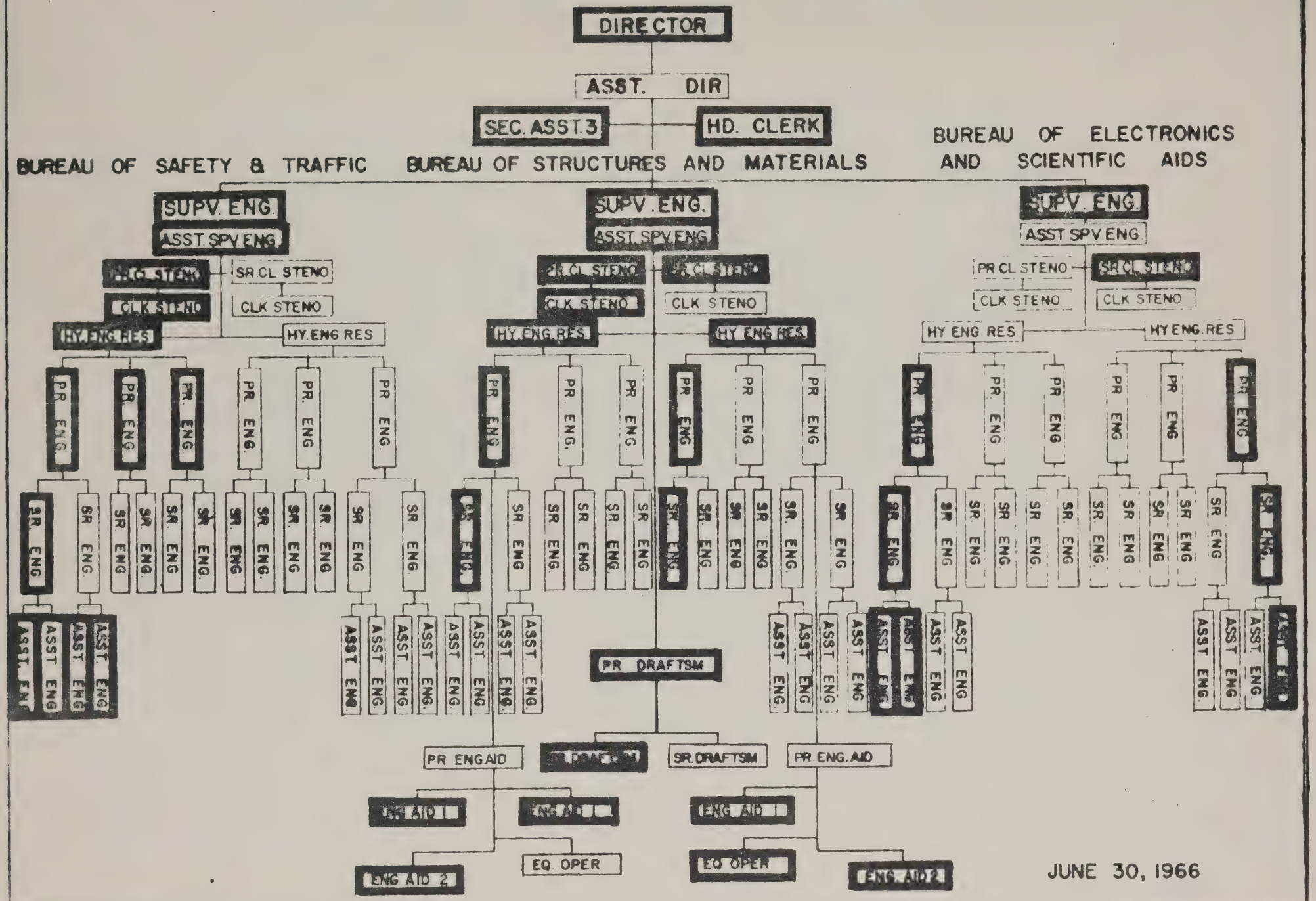
BUREAU OF ELECTRONICS & SCIENTIFIC AIDS



DIVISION OF RESEARCH AND EVALUATION



BIOGRAPHIES

of

PERSONNEL

WESLEY R. BELLIS

After graduating from Rutgers in 1926 with a B.S. degree in Civil Engineering, Mr. Bellis worked for a short time with the Concrete Steel Company in New York City and with the Port of New York Authority. With the Port of New York Authority, he was assigned to the location surveys for the Goethals Bridge between Bayonne, New Jersey and Port Richmond, Staten Island, New York City.

He then started work with the New Jersey State Highway Department in March of 1927 as a Junior Engineer, where he has worked continually progressing to the position of Director of the Division of Research and Evaluation. During World War II, he served with the Armed Service Forces as a Highway Traffic Engineer, with an assimilated rank of Lieutenant Colonel, in the French and German combat areas for nine months, while on leave from the Highway Department. He has been instrumental in the design of numerous unique channelized intersections and has played an important part in many of the achievements for which the New Jersey State Highway Department is justly noted throughout the world. He was a major factor in the selection of the alignment location for the New Jersey Turnpike (then Routes 100 and 300) and for the Garden State Parkway (then Route 4). He also was responsible for traffic volume estimates used in the design of these roads.

Mr. Bellis is listed in Marquis Who's Who in the East; he is a member of the Institute of Traffic Engineers and of the Engineers Club of Trenton and is a licensed Professional Engineer in New Jersey. He has served as the chairman of a Committee on Medians in the Institute of Traffic Engineers; he has served on the Committee on Traffic for the American Association of State Highway Officials; and with the Highway Research Board has served on the Committees of Highway Capacity, Channelization and Operational Effects of Geometrics.

He served on the faculty of Columbia University of New York City as a lecturer in traffic engineering for six years, and has lectured at Rutgers and other schools.

WESLEY R. BELLIS (CONT'D)

He is the author of the following published articles:

1. Traffic Report, Before and After Improvement of the Intersection of Route 1 and 25, published in the Proceedings of the 30th Annual Meeting of the Highway Research Board, 1951.
2. Selecting Intersection Types by Traffic Volume, published in the January 1951 Traffic Quarterly.
3. Cost of Traffic Inefficiencies, published in Traffic Engineering in November 1952.
4. "Highway Progress", published in the International Road Safety and Traffic Review for Spring 1953.
5. Directional Channelization Design, Highway Research Board Bulletin 72, 1953.
6. Shoulder Use, Highway Research Board Bulletin 170, 1958.
7. Increasing City Street Capacity, Traffic Quarterly, January 1959.
8. Capacity of Traffic Signals and Traffic Signal Timing, Highway Research Board Bulletin 274, 1960.
9. 30th Peak Hour Trends, Highway Research Board Record 27 in 1963.
10. Intersection Design Switch Point, Highway Research Board Record 105, 1966.
11. Highway Capacity Manual, with other Committee members of the Highway Research Board - both the original manual in 1950 and the new manual of 1965.
12. Channelization for Highway Intersections at Grade, with other Committee members - both for the original Highway Research Board report in 1950 and the report in 1962.

DR. RICHARD E. BORUP, PH.D.

Dr. Borup obtained his B.S. degree from the University of Minnesota in 1937. After teaching high school chemistry, physics, and mathematics for two years, he attended the University of Michigan where he received his M.S. degree in 1940. He earned his Doctorate at New York University in 1951. He performed post doctoral research at Balliol College, Oxford University, Oxford, England, and has traveled extensively throughout all of the free countries of Western Europe.

His industrial experience covers about 20 years in the field of petroleum, which includes exploration and production, refinery operations, laboratory control, and research and development at the lower and middle management levels. He has published several technical papers and has shared in several patents which have been issued to previous employers.

He is a veteran of World War II, having served with the U.S. Navy in both the Atlantic and Pacific theatres of operation. He holds the rank of Commander and is currently active in the Research Reserve Program under cognizance of the Office of Naval Research.

He has been a member of the American Chemical Society, American Association of the Advancement of Science, the American Petroleum Institute, American Society of Testing and Materials, the Institute of Radio Engineers, and is a Fellow of the American Institute of Chemists. He holds scholastic and academic honors including Phi Lambda Upsilon and the Society of Sigma Xi.

Dr. Borup came with the New Jersey State Highway Department as Supervising Engineer of the Bureau of Electronics and Scientific Aids in the Division of Research and Evaluation in June of 1965 after serving a year with the State of Alaska Highway Department, during which time he also taught at the University of Alaska.

Publications and Patents

1. "Polarographic Determination of Tetracthyl Lead in Gasoline" Proc. A.S.T.M., Vol. 47, 1947.

   A patent covering a portion of the apparatus developed for use in this procedure was issued to the Texas Company, (Texas).

2. "Gravimetric Determination of Zinc Utilizing the Radio-isotope Zn^{65}" Anal. Chem. Vol. 25, 1953.

   Ph.D. Thesis - in partial fulfillment of the requirements for the degree of Doctor of Philosophy at New York University, granted in June 1951.

3. "Conductometric Determination of Salt in Crude Oils"

   Presented at the 28th Midyear Meeting of American Petroleum Institute's Division of Refining, Benjamin Franklin Hotel, Phila., Pa., May 15, 1963, and published by the American Petroleum Institute.

   A patent covering the petroleum refinery process version of the instrument developed for this procedure was issued to the Cities Service Company.

4. "X-Ray Spectrographic Procedure for the Determination Calcium, Barium, Zinc and Lead in Hydrocarbon" Anal. Chem. Vol. 36, 1964.

David W. Gwynn

Before joining the New Jersey State Highway Department in May, 1965 as Supervising Engineer of the Bureau of Safety and Traffic, Mr. Gwynn was a Research Assistant in the Civil Engineering Department at West Virginia University. While at the University, he designed a transportation system for coordinating the three University Campuses. This system included the preliminary design; layout and coordination; operational aspects; and economic feasibility of the system. He also aided in research projects involving signalization, channelization, etc.

Prior to this, Mr. Gwynn was associated with the Virginia Department of Highways as Engineering Trainee, Traffic Engineer, and District Traffic Engineer. His last position was that of District Traffic Engineer for the Lynchburg District where he was responsible for all traffic engineering functions within a ten county area.

He is a graduate of Virginia Military Institute (1959) with a B.S. in Civil Engineering; a graduate of the Yale University Bureau of Highway Traffic (1962); and holds a Masters Degree in Civil Engineering from West Virginia University (1965).

He has served as an artillery officer in the U. S. Army and presently holds the rank of Captain in the Army Reserve.

He is an Associate Member of the Institute of Traffic Engineers, serving on three traffic operations committees. He is also a member of the Highway Research Board Committees on Quality of Traffic Service, Highway Safety and Vehicle Characteristics.

He is the author of the following publications and reports:

1. "Promoting Uniformity in Traffic Control Devices in Virginia's Municipalities", Traffic Engineering Magazine 1964.
2. "Low Level Bridge Lighting Installed in New Jersey", Traffic Engineering Magazine 1965.
3. "Accident Rates and Control of Access", Traffic Engineering Magazine 1966.
4. "The Use of Traffic Flow Measurements to Evaluate Signal Timings", Graduate Thesis, Yale University Bureau of Highway Traffic Library.
5. "A Bus Transportation System for West Virginia University", Graduate Thesis, West Virginia University Library.

Robert A. Pege

Mr. Pege began his professional career in June 1954 with the New Jersey State Highway Department. He progressed through various Departmental positions in the Bureau of Location and Design of the Roadway Division and the Bureaus of Design and Construction of the Bridge Division. His present position is that of Supervising Highway Engineer, Bureau of Structures and Materials of the Division of Research and Evaluation.

His efforts have encompassed a broad range of activities related to the design and construction of highways and bridges. Mr. Pege was instrumental in the introduction to the Department of electronic computer solutions of bridge design problems. His present responsibilities involve research and evaluation activities pertinent to highway pavements and bridges, with particular regard to material utilization and performance, design and analysis techniques, contract specification appropriateness, and construction and maintenance practices and problems.

Mr. Pege is a graduate of Drexel Institute of Technology (B.S. - June 1954) and of Newark College of Engineering (M.S. - June 1960). Both degrees were earned in the field of Civil Engineering. He is also a licensed professional engineer in the State of New Jersey.

Mr. Pege interrupted his career with the New Jersey State Highway Department to serve on active military duty, for 2 years, with the U.S. Army Corps of Engineers. He was assigned to the Board of Engineers for Rivers and Harbors in Washington, D.C. and was engaged in the preparation of classified engineering reports concerning foreign port facilities.

Mr. Pege is a member of the American Society of Civil Engineers and serves on two Highway Research Board Committees; Field Testing of Bridges, and Metals in Highway Structures. He currently chairs three Highway Department Committees; Materials and Methods of Construction, Equipment, and Stud Tire Test Procedures.

Mr. Pege is the author of a technical paper entitled "Design of Abutments and Retaining Walls by Electronic Computer". Other written works include two published classified engineering reports for the U.S. Army Corps of Engineers, and four electronic computer bridge design manuals for the New Jersey State Highway Department.

John L. Haller

Mr. Haller received his Bachelor of Science Degree in Civil Engineering from Drexel Institute of Technology in 1956. He is a member of the Mercer County Chapter of the New Jersey Society of Professional Engineers and also a member of the Association of Highway Officials of the North Atlantic States.

Upon graduation, Mr. Haller began his professional career with the New Jersey State Highway Department in July 1956 and until March 1964, he was assigned to the Geometric Design Group, Division of Roads, Design, and Construction. At that time, he was reassigned to the former Bureau of Engineering Research, which in mid-1964 was assimilated into the newly created Division of Research and Evaluation. He is currently the Assistant Supervising Engineer of the Bureau of Structures and Materials within the aforementioned Division.

He recently presented a paper at the Ninth New Jersey Asphalt Paving Conference held at Rutgers, the State University, entitled, "Investigations of Asphalt Paving Problems in New Jersey".

Eugene F. Reilly

Before joining the New Jersey State Highway Department in May, 1966, as Assistant Supervising Engineer in the Bureau of Safety and Traffic, Mr. Reilly was a traffic engineer for the Port of New York Authority. In the Traffic Engineering Division his duties included the design of proposed facilities and the safety improvements to existing terminal roadways. He also reviewed construction plans to insure safe construction practice and design.

Prior to his employment with the Port Authority, he was with the consulting firm of Tippetts-Abbett-McCarthy-Stratton. As a traffic engineer, he worked on the Regional Plan for Kanawha County in West Virginia. As a highway engineer, he designed the drainage systems for portions of the Van Wyck Expressway in New York, and served as assistant project engineer on highway projects in Alaska. He was also inspection supervisor for the Kew Garden-Van Wyck interchange in New York.

Mr. Reilly is a graduate of Manhattan College (1957) with a B.S. degree in Engineering, and holds a Masters Degree from the City College of New York (1962). He is also a graduate of the Yale University Bureau of Highway Traffic.

He is a registered Professional Engineer.

He is the author of the following report: "Weather and Vehicular Accidents", graduate thesis at Bureau of Highway Transportation, unpublished.

Myron X. Feld

Prior to his assignment as Engineer of Research in the Bureau of Safety and Traffic in December, 1964, Dr. Feld served the Highway Department as Assistant Administrator of the New Jersey Transportation Study with the Tri-State Transportation Commission. There his duties included long range Highway Planning and background transportation surveys and studies for the New York, New Jersey and Connecticut Metropolitan Region.

Before that, he served in a consulting capacity to the Borough President of Richmond, City of New York, and the Port of New York Authority in various phases of street and road planning for Staten Island and the connections to the Verrazano-Narrows Bridge.

His previous overseas background includes work as Project Engineer and Planner for the U. S. Air Base and Road Construction in Turkey and Ethiopia; and as Director of Planning and Development for the Israel Institute of Technology. Other previous experience includes Site and Road Planner for the Township of Hamilton, Mercer County, New Jersey; Assistant Professor of General Engineering (Planning) at Rutgers University; and River and Harbor Engineer in the New York District.

During World War II, he served as Chief Warrant Officer in charge of Anti-Aircraft Defense Planning for various metropolitan centers in the American and Pacific Theaters.

He is a graduate of the City College, City of New York (B.S.E. 1936) (M.C.E. 1937). He has completed graduate studies involving City and Regional Planning, Architecture, Public Works Administration, and Psychology (Ps.D. - Neotarian College - 1950).

He is a registered Professional Engineer and licensed Land Surveyor in the State of New Jersey. Professional Memberships include: (1) Society of Professional Engineers, (2) American Institute of Management, (3) Institute of Traffic Engineers, and (4) N. J. Society of Municipal Engineers (Past President).

His publications include:

1. Parks and Parkways in the City Plan - C.C.N.Y. 1937.
2. Cluster Garden Subdivision - American City, July 1959.
3. New Ideas for Subdivision Layouts - House & Home, September 1959.

George S. Kozlov

Mr. Kozlov began his professional career in 1943.

Before joining the Division of Research and Evaluation, Bureau of Structures and Materials in February 1965 as a Highway Engineer, Research, Mr. Kozlov was associated with the Department of Conservation and Economic Development, Division of Water Policy and Supply, Bureau of Design and Construction in the capacity of a Supervising Engineer. The Bureau administered the planning, design, and construction of all phases of the Round Valley-Spruce Run Reservoir project. His duties included real estate problems and review of designs, drawings, and specifications. He participated in every phase of planning and design for the project noted, but his main responsibility was the review for adequacy and safety of all structural design.

Before that, he was engaged in the capacity of Structural Engineer in design and construction with several private consultants and industrial organizations. Some of his associations included the following: Foster Wheeler Corp., EBASCO SERVICE, INC., Johns-Manville Corp. and overseas Negrelli A. G. in Vienna, Austria. His duties included supervision, design, investigation and some field assignments primarily in the U.S.A.

It included steel, reinforced concrete, masonry and wood structures, such as power stations, factory buildings, pumping stations, boiler structures, concrete and steel piping systems, conduits and tunnels, some bridges, roads and sewer and drainage systems.

He graduated from the Institute of Technology in Munich, Germany (Diplom-Ingenieur) in 1943. He has completed graduate studies in Civil and Structural Engineering.

He has been a registered Professional Engineer in the State of New Jersey since 1957.

John H. Stephan

Mr. Stephan began his career with the New Jersey State Highway Department in November 1924. He was assigned to the former Bureau of Engineering Research in 1938. He is currently a Highway Engineer, Research with the Division of Research and Evaluation, Bureau of Structures and Materials.

During World War II, Mr. Stephan was employed by the Corps of Engineers from June 1942 to December 1943. He had responsible charge of construction storage areas, water supply, sanitary and storm sewer and railroad facilities for Belle Meade Depot; and of engineering, Stewart Field, New York. From December 1943 to November 1945, he served with the Combat Engineers in the European Theatre of Operations.

Some of his many activities with the New Jersey Highway Department included studies of various pavement types for the purpose of developing factual information relating to basic behavior and overall performance; and of difficulties and damage of various kinds with certain movable and fixed types of bridges. He presented a paper at the 45th Annual Meeting of the Highway Research Board, entitled, "Reinforced Bituminous Overlays in New Jersey".

Kenneth C. Afferton

Mr. Afferton joined the Highway Department in June 1963 entering its training program for Assistant Engineers. Later in that year he was granted a leave of absence to perform graduate work in soil mechanics and structures. Following the successful completion of his graduate duties he rejoined the Department taking the position of Research Engineer with the Division of Research and Evaluation.

Mr. Afferton's work activities have included the planning and directing of foundation investigations for various pavement and bridge distress studies, the preparation of reports on research projects for the State Highway Engineer and the Bureau of Public Roads, the supervising of the Highway Department's Quality Control research project, and representing the Department at various conferences on asphalt paving technology and statistical quality control of highway construction.

Mr. Afferton received his Bachelor of Civil Engineering Degree from Cooper Union School of Engineering in 1963 and a Master of Science Degree from Northwestern University in 1965. He is presently a member of the American Society of Civil Engineers.

William T. Baker

Before joining the New Jersey State Highway Department in December, 1965 as a Research Engineer in the Bureau of Safety and Traffic, Mr. Baker was employed by the U. S. Bureau of Public Roads, Office of Highway Safety, for two years. As a Highway Engineer, his duties included assisting the Coordinator of the Federal Spot Improvement Program, staff engineer on a cooperative accident records project with the states, and related highway safety work where the Federal-State relationship exists.

Mr. Baker's earlier experience includes land surveying, highway surveying, and preliminary highway engineering with the consulting firm of Michael Baker, Jr. & Associates, doing work on the Federal Interstate System.

Mr. Baker is a graduate of Youngstown University (B.S.C.E. 1962). He received a Masters Degree in Civil Engineering from the University of Washington in 1964 where he was employed as a research assistant.

Mr. Baker is currently a Junior Member of the Institute of Traffic Engineers, serving on three traffic operations committees. He also is a member of the Highway Research Board's Committees on Traffic Safety and Vehicle Characteristics.

Mr. Baker is the author of the following publication: "Automating Traffic Accident Records", Trend in Engineering, Seattle, Washington, University of Washington, April 1964.

ARTHUR A. HEBERLEIN

Mr. Heberlein, a member of the Bureau of Electronics and Scientific Aids since July 1965, completed a career of some 42 years with the Bell Telephone Laboratories to retirement, before becoming associated with the New Jersey State Highway Department, Division of Research and Evaluation. His interests and experience covered many areas of the communication field in the Bell System. As a member of the Laboratories' technical staff, typical responsibilities included the following:

a. field trial engineering in the original development of long haul carrier telephone systems

b. field trials and application studies in connection with the development of long lived electron tubes for the Bell System. This also covered the development of methods and test sets for electron tube maintenance.

c. in the field of military reliability, specialized in the assessment and failure analysis of pilot lamps, indicating devices, counter tubes, and the original development of laboratory life test gear.

Since July 1965 participated in development and evaluation effort in feasibility studies of "Talking Pavements", radio or audio directions for motorists and most recently on Emergency Call Systems.

Mr. Heberlein is a graduate of the College of the City of New York with a degree of Bachelor of Science in engineering in 1921. During his senior year he was associated with the CCNY Physics Department as an active instructing tutor. Subsequently, in June 1923 he acquired the degree of Electrical Engineer (which is now equivalent to a Master of Science in Electrical Engineering) as a result of post graduate study at the Polytechnic Institute of Brooklyn. This was prior to joining the Department of Development and Research of the American Telephone and Telegraph Co. as an engineer in July 1922.

He participated in a brief enlistment in the U.S. Army in the summer and fall of 1918 which was terminated by the end of World War I, as of December 1918.

Mr. Heberlein is a Senior Member (1948) of the Institute of Electronic and Electrical Engineers, as well as a member of the Audio-Electroacoustics and Vehicular Communications groups. He was recently appointed a member of the SC-3 Electronic Research in the Highway Field Committee of the Highway Research Board, Washington, D.C. He is a registered Professional Engineer in the State of New York since August 1936.

Publications

In this connection he was responsible for writing and editing all Bell System Practices, describing electron tube test sets and field operating procedures. He was the author of a paper appearing in the Bell Laboratories Record, May 1958, subject: "A New Portable Electron Tube Tester".

Fanchon Melton

Before joining the New Jersey State Highway Department in October, 1965 as a Research Engineer in the Bureau of Safety and Traffic, Mrs. Melton was employed by the New York City Department of Traffic for five years. Her duties began as a Junior Engineer in the Parking Division. Later assigned to the New York City Highway Transportation Studies Group as a Highway Research Specialist, she supervised a large drafting service as well as writing text for reports published by the Group.

Prior to her employment by the Department of Traffic, she was with DeLeuw, Cather and Company and worked on a Bi-State Transit Loop Study.

While her husband was in service with the U. S. Army, she served as a cartographer for the Inter-American Geodetic Survey, an Army Map Service based in the Panama Canal Zone.

Mrs. Melton is a graduate Civil Engineer from the City College of the City of New York (1958). She is an Associate Member of the Institute of Traffic Engineers serving on both the Philosophy of Signs and Delineation of Exit and Entrance Ramps, Intersection Channelization and Roadway Obstructions committees.

JOHN C. O'CONNOR, P.E.

Mr. O'Connor began his professional engineering career in 1937 as an Aeronautical Engineer in the Glenn L. Martin Company of Baltimore, Maryland, following graduation from the University of Michigan, B.S. AeE., 1936. He was independently employed from January, 1937, until January, 1966, except for duty in the U. S. Army Air Corps from August, 1942 to December 13, 1945. His Highway Department career started with the Bureau of Electronics & Scientific Aids in January, 1966.

From 1960 to 1966, Mr. O'Connor was a partner in the engineering firm of O'Connor & Shea. He invented and supervised the building of a plant and machinery for the manufacture of concrete conduits for sale to operating companies of the American Telephone & Telegraph Company.

In 1957, 1958 and 1959, Mr. O'Connor held a consulting engineering contract with the Bell Telephone Laboratories, Inc., to investigate the causes of failure of guidance packages in Hercules and Zeus guided missiles, due to vibrations, and to devise means to attenuate these causes of failure.

From 1946 to 1956 he caused the formation of three corporations, The O'Connor Machine Works, Inc. (manufacturer of vibration generators used in concrete block machines, vibratory conveyors, concrete consistometers and taconite iron ore pelletizers); The O'Connor Patent Company (owner of nine patented inventions of Mr. O'Connor); and the O'Connor Abrasive Wheel Company (manufacturer of segmental type abrasive wheels for high production grinding machines). In addition to engineering matters related to these companies he attended to patent licenses and tax litigation.

In 1942, 1943, 1944, and 1945, he was with the Material Command of the Army Air Corps, Equipment Laboratory, Special Weapons Section, as a research and development engineer officer, where he invented a ground skimming glide bomb and conceived of and executed the navigational test program for the American copy of the German V-1 missile.

Between 1937 and 1942, he invented a glareless automobile headlight, performed consulting engineering services to the concrete masonry industry, devised a technology for quieting noisy machines, performed acoustical engineering services, and invented a radiant cooling means for hospital operating rooms.

In addition to attending the University of Michigan, he also attended the University of Notre Dame, 1930-1933, studying Mechanical Engineering.

Mr. O'Connor is an experienced glider pilot, and has built and sailed a schooner yacht on the Great Lakes.

U.S. & CANADIAN PATENTS (YEAR)	TITLE
2,353,492 (7-11-44) & 431,592 (12-4-45)	VIBRATION PRODUCING MECHANISM
2,418,982 (4-15-47)	ROCKING MIXER
2,420,793 (5-20-47)	VIBRATORY DRILLING APPARATUS
2,439,219 (4-6-48)	APPARATUS FOR TRANSMITTING INTENSE VIBRATIONS FOR PERFORMING WORK (SPRING)
2,500,293 (3-14-50)	VIBRATORY DUMP TRUCK
2,636,719 (2-1-53) & 501,683 (4-20-54)	MECHANISM FOR PRODUCING HARD VIBRATIONS FOR COMPACTION & CONVEYING MATERIALS
2,669,447 (2-16-54)	APPARATUS FOR TRANSMITTING INTENSE VIBRATIONS FOR PERFORMING WORK (ALUMINUM SPRING)
PATENT APPLICATION WHICH WAS ABANDONED	GLARELESS AUTOMOBILE HEADLIGHT

CLASSIFIED MILITARY REPORTS OF U.S. AIR FORCE and/or U.S. ARMY AIR CORPS:

See author index for 1943, 1944, 1945 and 1960.

LEGAL PAPERS:

TAX COURT BRIEF in The O'Connor Patent Company vs. Commissioner, T.C. MEMO. 1957-50
also CCH Dec. 22,306 (M)

Joseph Seifert

Prior to joining the New Jersey State Highway Department in May, 1966 as a Research Engineer in the Bureau of Safety and Traffic, Mr. Seifert was a graduate student at West Virginia University and majored in traffic and planning. While there, he became familiar with programming and computers and compiled as Origin-Destination Study in the City of Morgantown, West Virginia.

Before entering the graduate school at West Virginia University, he was with the U. S. Forest Service at Elkins, West Virginia, as a Civil Engineer. He surveyed and designed low class roads in the Monongahela National Forest, inspected construction projects, and prepared location plans.

Prior to this, he was an Engineering Aide for the Village of South Orange, New Jersey, where drafting, surveying and mapping were his main duties.

Mr. Seifert received a B.S. degree in Civil Engineering from the Newark College of Engineering (1962) and holds an M.S. degree in Civil Engineering from West Virginia University (1966).

Edward T. Yannul

Mr. Yannul began his employment with the Highway Department in March 1966 as a Research Engineer in the Bureau of Structures and Materials.

Prior to that, he was an Instructor of General Engineering for the Pennsylvania State University. He taught courses in structural design, engineering drawing, and mechanics at the Berks Center of the University.

Mr. Yannul has worked as a Civil-Structural Engineer for the Fourth Naval District primarily on the design and investigation of structures and foundations, and on the review of various naval facilities designed by consultants. He has also engaged in highway soil-testing at Villanova University; and fallout shelter analysis and design for the Navy, and for a private consultant.

Mr. Yannul received a Bachelor of Civil Engineering Degree from Villanova University in 1959 and a Master of Science Degree in Civil Engineering from the University of Pennsylvania in 1964. His graduate studies were primarily in the field of structures.

Mr. Yannul is affiliated with the American Society of Civil Engineers, The Pennsylvania Society of Professional Engineers, and The American Society of Engineering Education.

Louis F. DiNicola III

Mr. DiNicola received his Bachelor of Science Degree in Civil Engineering from the University of Notre Dame in 1964. He has taken several post graduate courses at the University of Notre Dame and the University of Delaware leading towards a Masters Degree.

He began his professional career with the New Jersey State Highway Department as a Senior Engineer, Research, in February 1965. Some of his activities included assisting in the activities of various pavement distress studies and the preparation of reports on said investigations. He also participated in research projects dealing with bituminous concrete construction and pavement skid resistance.

RICHARD L. HOLLINGER

Mr. Hollinger received a Bachelor of Science degree in chemistry from Juniata College in 1963. He was employed as a research assistant at Juniata College until the fall of 1964. He then accepted employment with the physics department of Juniata College as an electronics assistant. In June of 1965 he accepted employment as an Engineer of Research with the Division of Research and Evaluation of the New Jersey State Highway Department, with which he is presently employed.

Mr. Hollinger's duties include computer programming and the study of control of automobile exhaust pollution.

JOHN McLAINE, B.S.M.E.

Mr. McLaine studied engineering at Carnegie Institute of Technology and at the University of Detroit. He was granted a Bachelor's Degree in Mechanical Engineering in 1932 from the University of Detroit, and started his career in the transportation industry at that time.

Mr. McLaine has written a number of publications on automotive safety equipment, and presented numerous papers at technical meetings. He has also served on a number of committees of the Society of Automotive Engineers, and on the Mercer County Traffic Safety Council.

In addition to his work in the surface transportation industry, Mr. McLaine has done considerable research, development, and evaluation work in the aircraft and missile fields.

He started working with the Bureau of Electronics and Scientific Aids as a Senior Engineer in March 1965 where he has concentrated on fog dispersal tests.

Titles of Papers Presented by J. McLaine at Meetings of the SAE and other Organizations

1. Brake Testing (Correlation of tests made on Laboratory Inertia-type Dynamometers with actual road tests)

2. Stopping Distance Variations (Effects of various types of road surfaces and various tire tread designs and compounds on stopping distances)

3. Bonding of Brake Lining (Results of tests on lining bonded to shoes by various methods)

4. Brake Fluid Requirements (Heat resistance and other required properties as shown by laboratory and field experiments)

5. Quality Control Charts (The use of statistical control charts in missile motor chamber production)

Publications Written by J. McLaine

1. Modern Brakes (A series of articles describing the engineering principles involved in the design of automotive braking equipment)

2. Brakes & How They Work (An illustrated booklet which makes extensive use of cut-away drawings and photos to explain the operation of mechanical, hydraulic, vacuum power, and air brake equipment used on passenger cars, trucks, trailers, and buses)

3. Brake Service Manual (Describes improved methods of adjusting and servicing brake equipment, and includes laboratory tested procedures for locating sources of trouble)

4. Hydraulic Brake Parts Manual (Outlines the technical characteristics required in wheel cylinders, master cylinders, and brake fluid for optimum safety on the highway)

John J. Quinn

Mr. Quinn joined the New Jersey State Highway Department in December 1950 and was assigned to the Bureau of Engineering Research in October 1951. He worked with the Bureau mainly as chief of party investigating and evaluating various pavements and bridges throughout the State.

This assignment was interrupted from 1952 to 1956 by service in the U. S. Navy.

Mr. Quinn received an Associate of Science Degree from Trenton Junior College in 1958, while on leave of absence from the Department. He is presently attending Drexel Institute of Technology Evening College.

Irwin Chodash

Mr. Chodash began his professional career with the New Jersey State Highway Department as an Assistant Engineer in the Bureau of Safety and Traffic in January, 1965. His duties are varied and include the following: analysis of signalized intersections; accident volume relationship on Route 22; and a study of the social and economic effects of the Verrazano-Narrows Bridge on New Jersey.

Mr. Chodash is a graduate of the City College of New York (1964) with a B.S. Degree in Meteorology, and is a member of the American Meteorological Society.

He is now attending the Polytechnic Institute of Brooklyn in a program which will eventually lead to a Masters Degree in Urban Transportation and Planning.

ANDREW J. DYKA

Before joining the State Highway Department in June 1966, Mr. Dyka completed 23 years of military service. He began his professional career in 1942 as a Meteorological Officer with the United States Army Air Force. During 1943-1947 he served as a Weather Reconaissance Officer with the U.S.A.A.F. at various military bases in the United States and overseas. With the United States Air Force, during 1948-1965, he served as a Weather Engineering and Survey Officer, Ground Electronics Officer, and Communications-Electronics Staff Officer, until his retiremett from active military duty.

Mr. Dyka is a graduate of Saint Lawrence University (Bachelor of Science) in 1942 and also attended New York University, College of Engineering, and several Department of Defense (U.S.A.F.) Technical Training Command Schools. He is a member of the U.S.A.A.F. Retired Reserve, in grade of Leiutenant Colonel.

VINCENT E. GAZZILLO

Mr. Gazzillo joined the staff of the Division of Research and Evaluation of the New Jersey State Highway Department in November 1965 as an Assistant Engineer, in which capacity he is presently serving.

Having been a 1965 college graduate, his professional contribution is understandably limited at this writing. He has, however, been concerned with research projects under the jurisdiction of the Bureau of Electronics and Scientific Aids, primarily the fog study, and has received training in the art of computer programming.

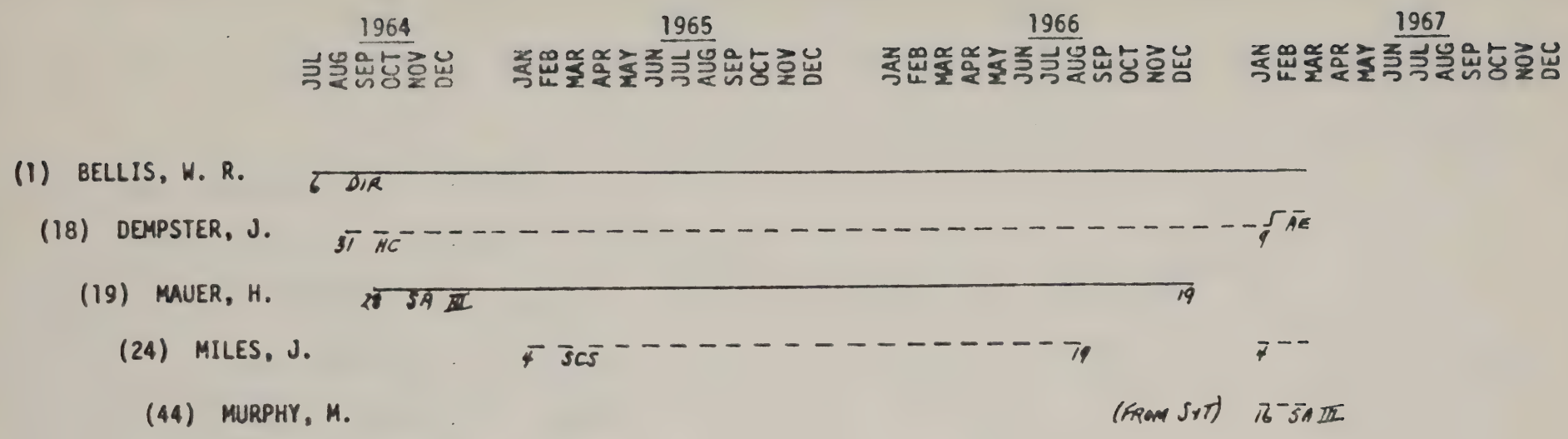
Mr. Gazzillo is a graduate of St. Joseph's College (B.S. in Physics) where he was a member of Sigma Pi Sigma, Physics honor society.

Mahmood Sherkat

Mr. Sherkat received his Diploma in Civil Engineering from the University of Teheran, Iran in 1958. In 1962, he received his Master of Science Degree in Civil Engineering from the University of Pennsylvania. Currently, he is working towards a Ph.D. Degree in Civil Engineering at the University of Pennsylvania, Graduate School of Arts and Sciences.

He became associated with the New Jersey State Highway Department in February 1963, assigned to the former Bureau of Planning and Traffic. In July 1964, he was reassigned to the then newly created Division of Research and Evaluation as an Assistant Engineer.

Some of his activities included evaluations of materials used in the construction of rumble strips and investigations of laboratory skid testing equipment.



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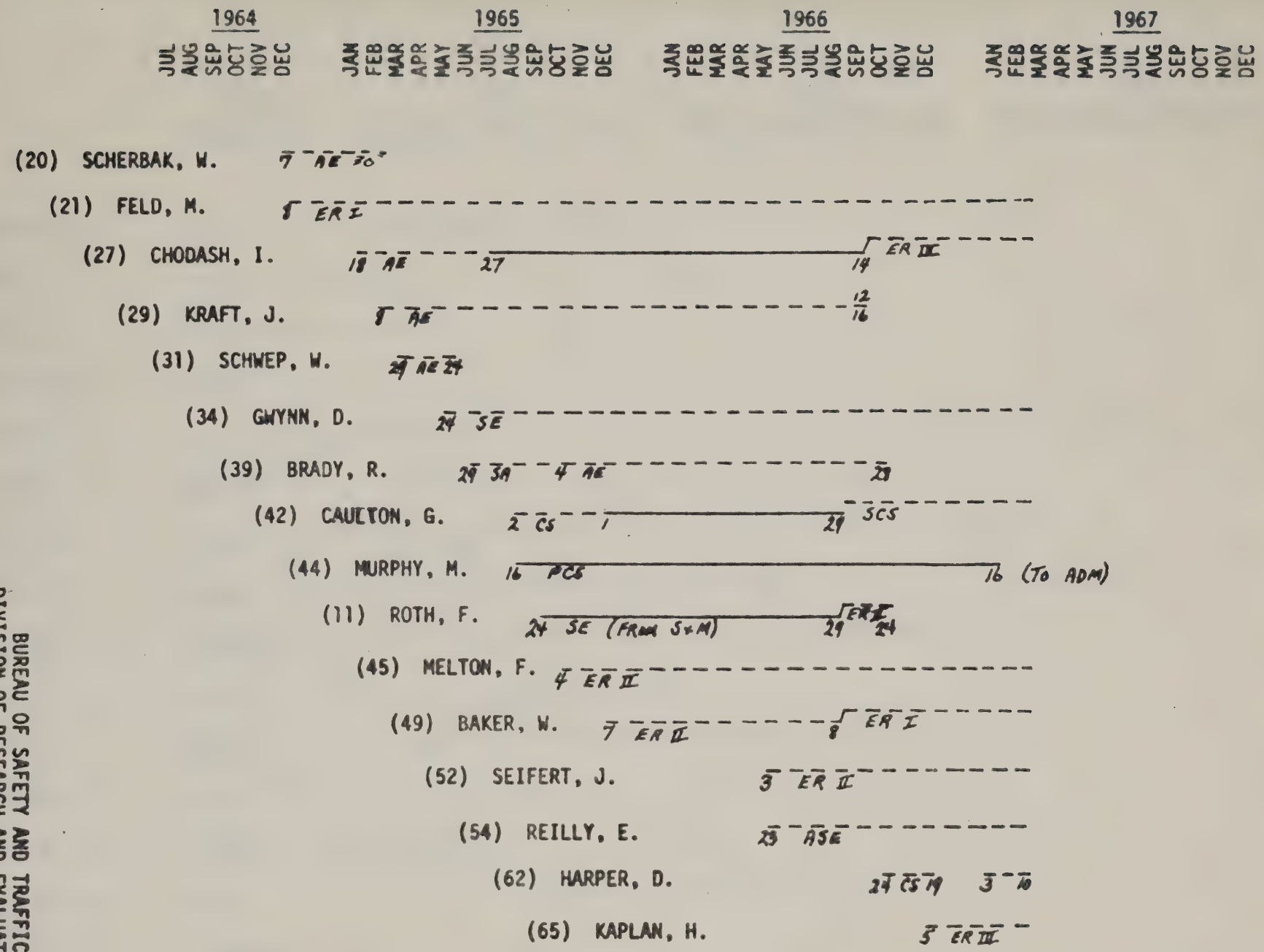
ADMINISTRATION
DIVISION OF RESEARCH AND EVALUATION



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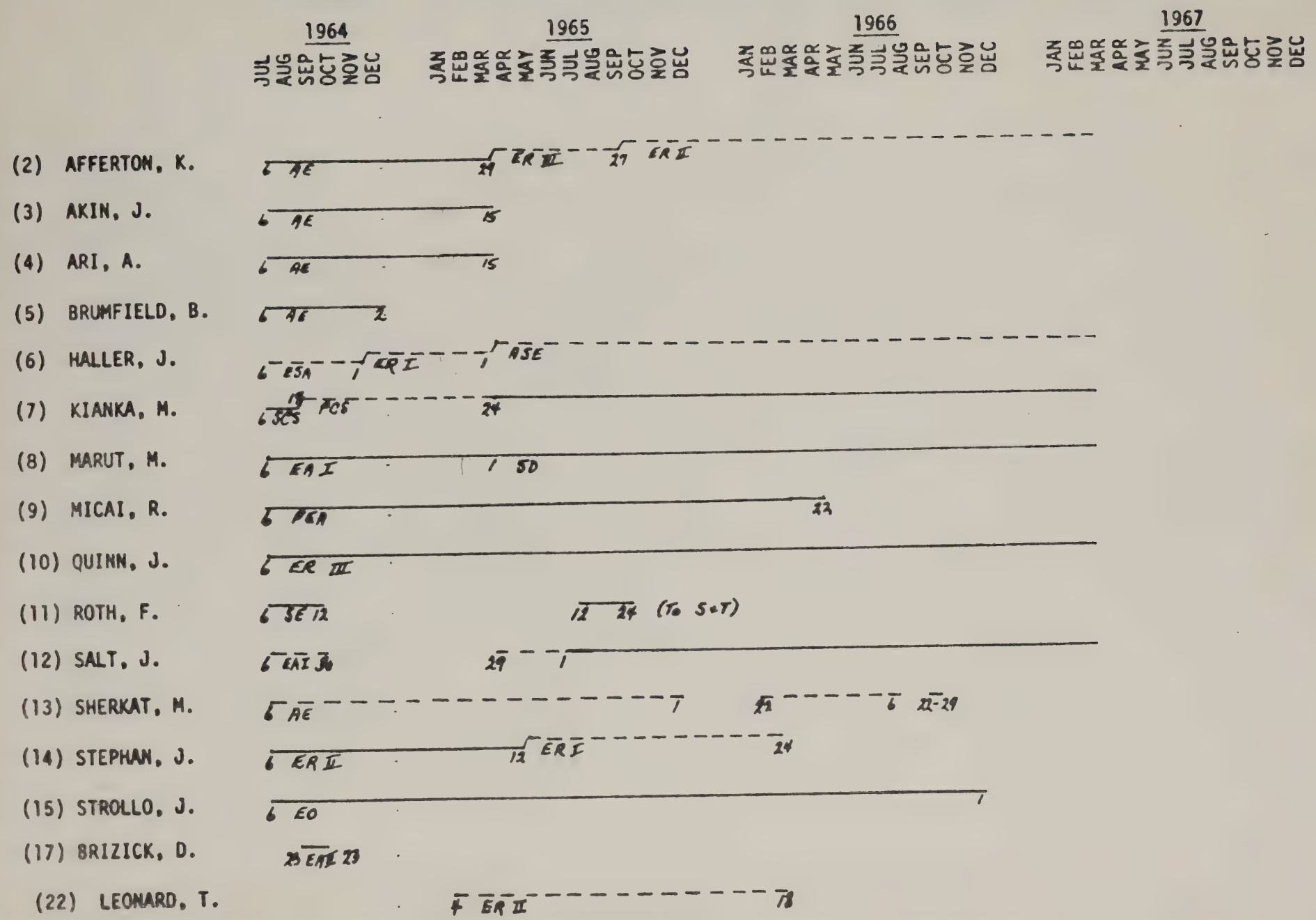
DIVISION OF RESEARCH AND EVALUATION


1964
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1967
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
(2) AFFERTON, K.
(3) AKIN, J.
(4) ARI, A.
(5) BRUMFIELD, B.
(6) HALLER, J.
(7) KIANKA, M.
(8) MARUT, M.
(9) MICAI, R.
(10) QUINN, J.
(11) ROTH, F.
(12) SALT, J.
(13) SHERKAT, M.
(14) STEPHAN, J.
(15) STROLLO, J.
(17) BRIZICK, D.
(22) LEONARD, T.
(To S+T)

(23) POVIA, P. — 4 SCS — 9

(26) PEGE, R. — 18 SE — [illegible]

(28) MARGERUM, B. — 3 EA II — 1 EA I

(30) DI NICOLA, L. — 15 ER III — 26

(33) KOZLOV, G. — 26 EA I — 21

(41) JORDAN, J. — 2 SA 4 EA II — 12

(43) LEVENTHAL, M. — 2 SA 4 EA II — 20

(47) GRAYCAR, M. — 2 PD

(51) YANNUL, E. — 15 ER II — 9

(53) BAKER, R. — 9 EA I

(56) FURDA, M. — 27 CS

(58) WILLIS, B. — 12 D

(60) GREEN, T. — 26 SD

(61) LAWRENCE, I. — 10 SCS

(63) FERVAL, R. — 28 AE

(66) REES, F. — 3 EA II

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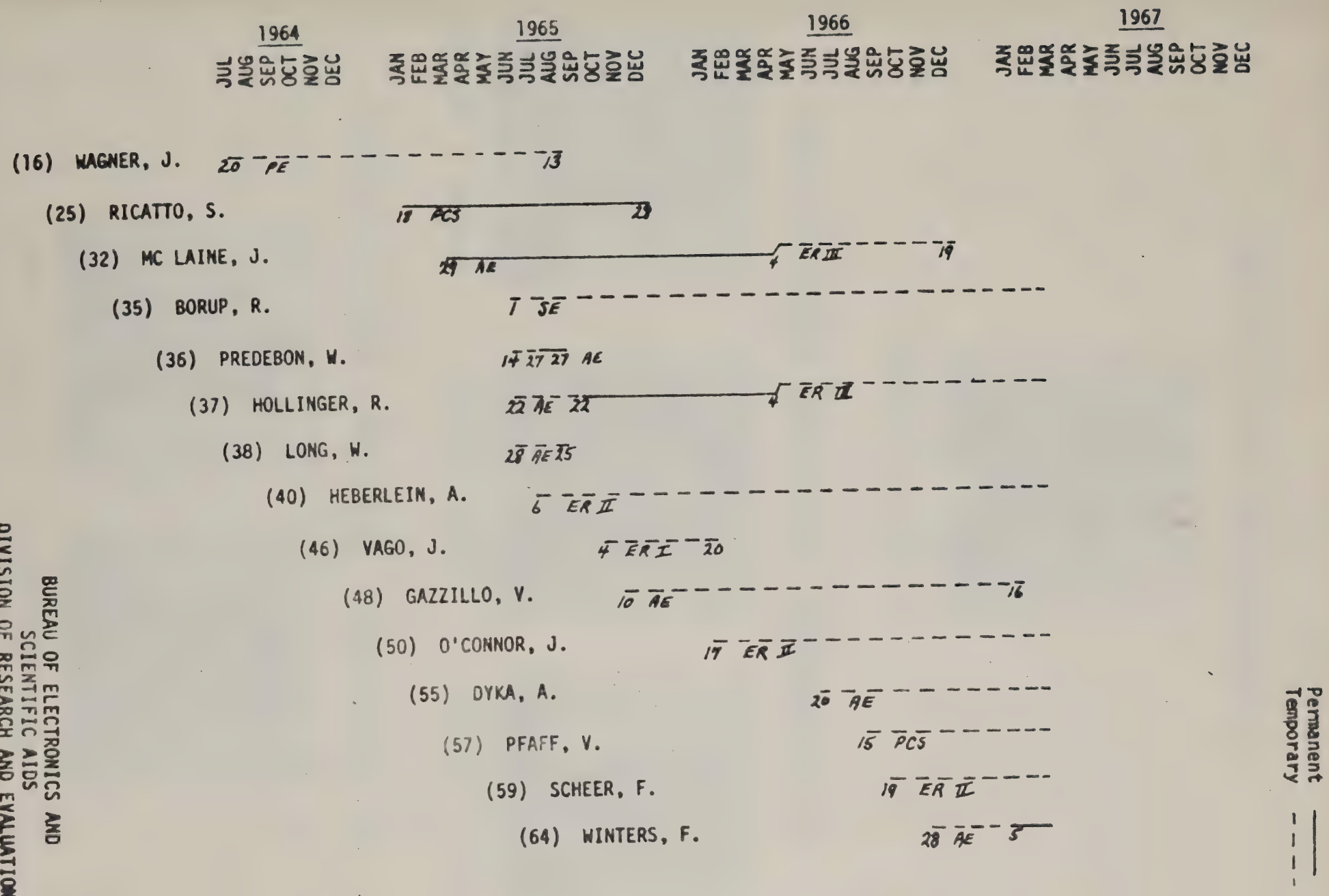
Temporary - - - -

BUREAU OF STRUCTURES AND MATERIALS
DIVISION OF RESEARCH AND EVALUATION



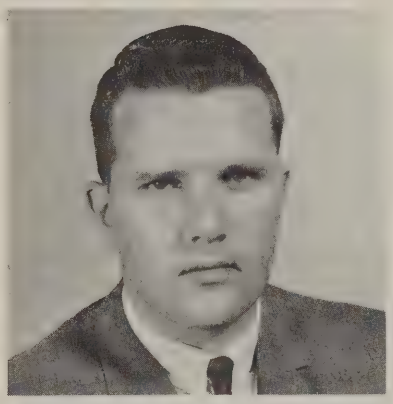
BUREAU OF ELECTRONICS AND
SCIENTIFIC AIDS
DIVISION OF RESEARCH AND EVALUATION

DIRECTOR OF RESEARCH

WESLEY R. BELLIS

SUPERVISING HIGHWAY ENGINEER I

RICHARD E. BORUP



DAVID W. GWYNN

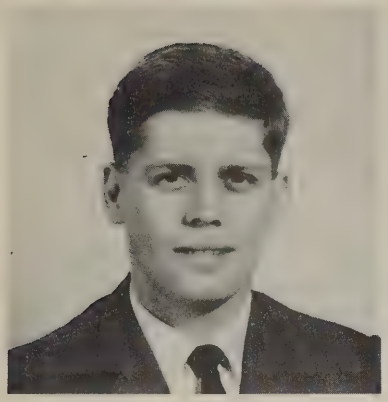
ROBERT A. PEGE

SUPERVISING HIGHWAY ENGINEER II

JOHN L. HALLER

EUGENE REILLY

ENGINEER OF RESEARCH I



WILLIAM T. BAKER

MYRON X. FELD

GEORGE KOZLOV

JOHN STEPHAN

JULIUS VAGO (1)

ENGINEER OF RESEARCH II

KEN AFFERTON

A. HEBERLEIN

FAN MELTON

J.C. O'CONNOR

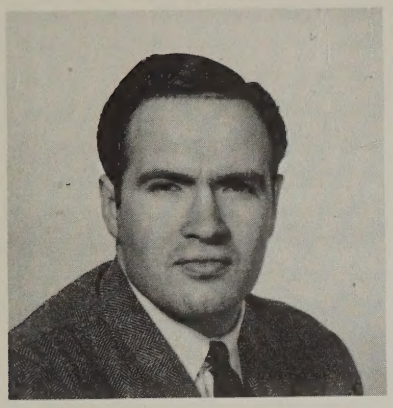
JOSEPH SEIFERT

THOMAS LEONARD (1)

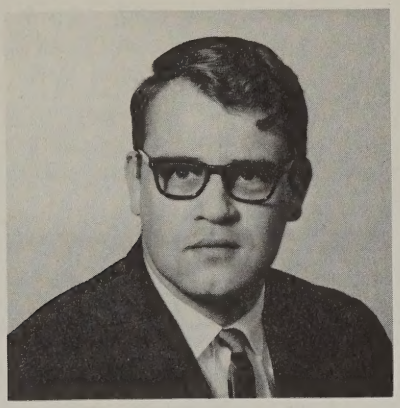
EDWARD YANNUL

(1) NOT EMPLOYED AT END OF YEAR

ENGINEER OF RESEARCH III

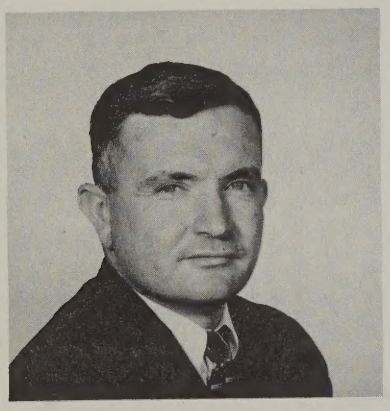


IRWIN L. CHODASH



RICHARD HOLLINGER

JOHN McLAINE



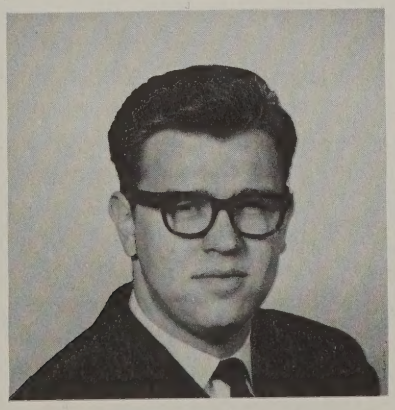
JOHN QUINN

LOUIS DiNiCOLA

FRANK ROTH

ASSISTANT ENGINEER

ANDREW DYKA



VINCENT GAZZILLO

ROBERT BRADY
JERRY KRAFT
WAYNE LONG (I)
W. PREDEBON (I)
MAHMOD SHERKAT

(I) NOT EMPLOYED AT END OF YEAR